Listing of Claims

1. (Original) A method of modifying a nucleic acid molecule comprising;
contacting the nucleic acid molecule with a prokaryotic DNA repair ligase polypeptide.

2. (Currently Amended) [[A]]The method according to claim 1 wherein the prokaryotic DNA repair ligase polypeptide comprises one or more of: a primase domain, a nuclease domain, and a ligase domain, said one or more domains sharing greater than 20% sequence identity with the corresponding domain sequence of Mt-Lig (CAB08492).

3. (Currently Amended) [[A]]The method according to claim 1 wherein the prokaryotic DNA repair ligase polypeptide shares greater than 20% sequence identity with the sequence of Mt-Lig (CAB08492).

4. (Currently Amended) [[A]]The method according to claim 1 wherein the prokaryotic DNA repair ligase polypeptide is Mt-Lig (CAB08492) or a variant or allele thereof.

5. (Currently Amended) [[A]]The method according to claim 1 wherein the nucleic acid molecule and the Mt-Lig polypeptide are contacted in the presence of a prokaryotic Ku polypeptide.

6. (Currently Amended) [[A]]The method according to claim 5 wherein the prokaryotic Ku polypeptide shares greater than 20% sequence identity with the sequence of Mt-Ku (CAB08491).

7. (Currently Amended) [[A]]The method according to claim 6 wherein the prokaryotic Ku polypeptide is Mt-Ku (CAB08491) or an allele or variant thereof.

8. (Currently Amended) A method of ligating nucleic acid molecule ends comprising:
contacting a first nucleic acid end and a second nucleic acid end with a prokaryotic DNA repair ligase polypeptide,
wherein said first and said second nucleic acid ends are non-compatible.

9. (Original) [[A]]The method according to claim 8 wherein said first and said second nucleic acid ends comprise non-complementary overhang regions.

10. (Currently Amended) [[A]]The method according to claim 8 wherein the first end is on a first nucleic acid molecule and the second end is on a second nucleic acid molecule.

11. (Currently Amended) [[A]]The method according to claim 10 wherein the first and second nucleic acid molecules are DNA.

12. (Currently Amended) [[A]]The method according to claim 10 wherein the first nucleic acid molecule is DNA and the second nucleic acid molecule is RNA.

13. (Currently Amended) [[A]]The method according to claim 8 wherein the first and second ends are on the same nucleic acid molecule.

14. (Currently Amended) [[A]]The method according to claim 8 further comprising isolating the ligated nucleic acid molecule, ~~and/or~~ purifying the ligated nucleic acid molecule, or both isolating and purifying the ligated nucleic acid molecule.

15. (Currently Amended) A method of labelling a nucleic acid molecule comprising: contacting a nucleic acid molecule having a first terminus with an prokaryotic DNA repair ligase polypeptide in the presence of labelled nucleotides.

16. (Currently Amended) [[A]]The method according to claim 15 wherein the nucleotides are NTPs.

17. (Currently Amended) [[A]]The method according to claim 15 wherein the nucleotides are dNTPs.

18. (Currently Amended) A method of filling in a single stranded gap in a double stranded nucleic acid molecule comprising:

contacting a double stranded nucleic acid molecule having a single stranded region with [[an]]a prokaryotic DNA repair ligase polypeptide.

19. (Currently Amended) [[A]]The method according to claim 18 wherein said nucleic acid molecule and said prokaryotic DNA repair ligase polypeptide are contacted in the presence of NTPs.

20. (Currently Amended) [[A]]The method according to claim 18 wherein said nucleic acid molecule and said prokaryotic DNA repair ligase polypeptide are contacted in the presence of dNTPs.

21. (Currently Amended) A method of removing a single stranded overhang from the end of a nucleic acid molecule comprising:

contacting said nucleic acid molecule with a prokaryotic DNA repair ligase polypeptide.

22. (Currently Amended) [[A]]The method according to claim 21 wherein the prokaryotic DNA repair ligase polypeptide is an Mt-Lig polypeptide.

23. (Currently Amended) [[A]]The method according to claim 21 wherein said nucleic acid molecule is contacted in the presence of Mg^{2+} or Mn^{2+}.

24. (Previously Presented) A method of producing an RNA molecule comprising:

contacting a prokaryotic DNA repair ligase polypeptide and a template DNA strand in the presence of NTPs.

25. (Currently Amended) [[A]]The method according to claim 24 wherein prokaryotic DNA repair ligase and template DNA are contacted in the presence of a primer oligonucleotide.

26. (Previously Presented) A method of producing an DNA molecule comprising:

contacting A prokaryotic DNA repair ligase polypeptide and a nucleic acid template in the presence of dNTPs and a primer oligonucleotide.

27. (Currently Amended) [[A]]The method according to claim 26 wherein the nucleic acid template is an RNA template.

28. (Currently Amended) [[A]]The method according to claim 8 wherein the prokaryotic DNA repair ligase polypeptide comprises one or more of: a primase domain, a nuclease domain, and a ligase domain, said one or more domains sharing greater than 20% sequence identity with the corresponding domain sequence of Mt-Lig (CAB08492).

29. (Currently Amended) [[A]]The method according to claim 8 wherein the prokaryotic DNA repair ligase polypeptide shares greater than 20% sequence identity with the sequence of Mt-Lig (CAB08492).

30. (Currently Amended) [[A]]]The method according to claim 8 wherein the prokaryotic DNA repair ligase polypeptide is Mt-Lig (CAB08492) or a variant or allele thereof.

31. (Currently Amended) [[A]]The method according to claim 8 wherein the nucleic acid molecule and the Mt-Lig polypeptide are contacted in the presence of a prokaryotic Ku polypeptide.

32. (Currently Amended) [[A]]The method according to claim 31 wherein the prokaryotic Ku polypeptide shares greater than 20% sequence identity with the sequence of Mt-Ku (CAB08491).

33. (Currently Amended) [[A]]The method according to claim 31 wherein the prokaryotic Ku polypeptide is Mt-Ku (CAB08491) or an allele or variant thereof.

34. (Previously Presented) A kit comprising an isolated Mt-Lig polypeptide for use in a method according to claim 1.

35. (Currently Amended) [[A]]]The kit according to claim 34 comprising an isolated Mt-Ku polypeptide.

36. (Currently Amended) [[A]]The kit according to claim 34 comprising dNTPs.

37. (Currently Amended) [[A]]The kit according to claim 34 comprising NTPs.

38. (Currently Amended) [[A]]The kit according to claim 34 comprising one or more of buffers, stabilisers and excipients.

39. (Currently Amended) A method of producing a prokaryotic DNA repair polypeptide comprising:

(a) causing expression from a nucleic acid which encodes a prokaryotic DNA repair polypeptide in a suitable expression system to produce the polypeptide recombinantly; and,

(b) testing the recombinantly produced polypeptide for prokaryotic DNA repair activity.

40. (Currently Amended) [[A]]The method according to claim 39 wherein the recombinantly produced polypeptide is tested for one or more of: non-complementary end ligation activity, DNA dependent RNA primase activity, 3'-5' exonuclease activity, DNA and RNA dependent DNA polymerase activity, DNA dependent RNA polymerase activity, ATP dependent DNA and RNA ligase activity and DNA terminal transferase activity.

41. (Currently Amended) [[A]]The method according to claim 39 wherein the prokaryotic DNA repair polypeptide is an Mt-Lig polypeptide or an allele or variant thereof.

42. (Currently Amended) [[A]]The method according to claim 39 comprising purifying said recombinantly produced polypeptide.

43. (Currently Amended) [[A]]The method according to claim 26 wherein the nucleic acid template is a DNA template.